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# MEMORANDUM

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TO: Gus Shubert

FROM: Dan Ellsberg

SUBJECT: REQUEST FOR PROJECT NUMBER

COPIES TO: J. A. Kershaw, B. H. Klein

DATE: 1-22-62

MEMO NO. M-560

1. I request that a project number be assigned to a study entitled: The Impact of Uncertainty on Military Decisions. The study would aim at the application of decision theory to problems of military decision-making in such areas as: Command and Control, R&D, Intelligence, Force Planning and War Planning, and the analysis of strategic objectives. To this end, a prior goal would be fundamental advances in decision theory to deal more adequately than has heretofore been possible with problems of decision under conditions of extreme uncertainty, or ignorance.

2. If approved, I propose to devote full time to this project for approximately one year. Research for the first phase--the development of a fundamental basis for analyzing problems involving extreme uncertainty--is essentially completed; I am now engaged in writing up the results, which should take about two months. I have also completed exploratory work in applying the analysis to each of the above areas.

3. The second phase, consisting mainly of application of decision theory in general (but the above conceptual advances in particular) to military problems, would be pursued in close collaboration with existing RAND projects in the above fields. Discussions with project leaders such as Marshall, Hoffman, Klein, Eldridge and Carne have indicated that there is a common core of conceptual problems which even existing decision theory could greatly illuminate, and which could particularly benefit from improvements in decision theory designed specifically for such applications. Some early payoffs in these areas have been clarifications of the concepts of flexibility and insurance, and of problems of measuring value of information (e.g., in Intelligence, R&D and Command Control). I anticipate output from this project of direct and substantial value to each of these other projects; however, it seems simpler to budget this joint product to a single project.

4. At least one area in this subject requires further fundamental theoretical work: the application of the concepts developed so far to problems of conflict and bargaining (i.e., the analysis of "games" as special cases of decision-making under uncertainty). Moreover, the applied work mentioned above will undoubtedly stimulate additional research on fundamental theory.

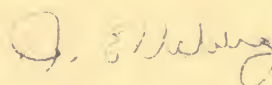
5. Although this would be initially a one-man project, it could obviously expand into a larger effort if interest developed, particularly in the phase of application. There are a number of people at RAND both interested and

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competent in the field of decision theory, and a unified attack in a number of the areas mentioned above could yield high rewards. (The work of Nelson and Winter in quite a different field--the value of weather forecasting--is a straightforward example of applied decision theory. Analysis of the value of reconnaissance satellites, of improved warning systems and/or reduced response time, of strategic intelligence, and of flexible force posture and contingency planning, could proceed along very similar lines; and would be highly worthwhile.)



Dan Ellsberg

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